195 ~~42~~-43-44 **File No.** 5257/36
IV

P.W. **DEPARTMENT**

B **CLASS** E **BRANCH**

Subject:— Public Works
Programme of — to provide
against the Post-War Slump.
Establishment — for

✓

B K 11744

File No. 5257/36 IV E

Ed. Sect. Slip. 24 A.

G.R., G.D., No. 2408, dated 22-6-22.]

Correspondence

DOCKET SHEET

Subject :—

File No. 5257/36 IV

P.W **DEPT.**

E **BRANCH.**

References :—

Date	To whom sent.	Notes and instructions.

Colonel Franks is pressing very hard for a large irrigation increase for Post War Reconstruction, especially for soldiers: Would Advisor (Revenue) let the Public Works Department put up quickly a comprehensive note on the possibility of Irrigation, not in detail, of coursse, but sufficient to either agree with Colonel Franks or to point out** large irrigation lakes in the Province cannot be increased by putting dams higher up in the catchment areas to form auxiliary storage (or can it ?).

** to him, for instance, that the storage capacity of our

Again, the idea of putting [illegible] the rivers which pass through the Bijapur and other districts in order to store water is futile bacause the storage of any appreciable quantity of water would probably innundate a larger area of land than the stored water could never irrigate, having regard especially to the great evaporation which would take place in these hot districts in large shallow sheets of water - (or does gokak prove this to be wrong?)

Again, pumping of water from the Deccan rivers in the East of the Deccan is entirely uneconomic owing to the heavy costs of machinery and of fuel, even in peace conditions -(or is this not the case provided a compact area can be taken under one management for Irrigation?).

Again, irrigation by windmill is entirely fultile because it is only intermittent and liable to fail when most needed (- or am I wrong?).

Again, irrigation of the faming areas from water stored in the Ghats is impracticable owing to the losses on taking water such a long distance (or not?)

Again, making tanks in famine areas is futile because they fail just when most needed - and the like.

2. I should be grateful if I might have something to protect myself against colonel Franks (or to encourage him with) before we go to Poona .

Id/- H.F. K(night)

30-4-43.

Adviser (Finance)

Please put up a note on these points. Some of them at any rate have been examined fairly recently.

Id/- I.H. T(aunton)

30-4-43.

Adviser (Revenue).

VERY URGENT.

No. 5257/36-I.

Public Works Department,
Bombay Castle, 1st May 1945.

Copies forwarded to the Superintending Engineers, Southern Circle, Central Circle, Deccan Irrigation Circle, and Northern Circle, for favour of submitting notes on the points raised in Mr. Knight's note as soon as possible but before the 10th instant.

By order of the Governor of Bombay.

Id/- 1-5-43.

Deputy Secretary to the Government of Bombay,
Public Works Department.

GJP. 1-5-43.

VERY URGENT.

No. M.I.(1) 2666 of 1943.

Public Works Department,

Poona, 8th May, 1943.

To

The Chief Engineer and Secretary to Government,
Public Works Department,
Bombay.

Subject:- Post War Reconstruction.

Reference:- Government endorsement No. 5257/36-I dated 1st May 1943.

The storage capacity of the existing large irrigation tanks cannot be increased by building additional tanks upstream as the lakes already formed by the Water impounded in most cases stretch back almost to the water shed of the Western Ghats.

2. In districts like Bijapur, Sholapur etc. it would not be practicable to provide bandharas unless there is some replenishment flowing in upstream, which is very exceptional. Furthermore evaporation which would be enormous would kill any scheme.

3. Even if the pumps were supplied free, the cost of fuel and oil would render pumping beyond the means of any cultivator. Even the existing small irrigation schemes with grid hydro electric pumping have not proved popular and application for water is only made as a last resource.

4. Irrigation by wind mill will not be successful as the plant is costly for the amount of water raised and winds are variable in this part of the country.

5. Irrigation of the famine areas from water stored in the ghats is uneconomical and extremely costly due to lossess in transit from evaporation and seepage, For every 10 cubic feet stored only one would reach its destination 100 to 150 miles to the east.

6. Tanks in famine areas would not be absolutely useless as although they fill only once in 3 years, they tend to rause the level of the sub soil water down stream of the bund and assist well irrigation.

7. Resort could be made to field bunding.

8. There are a number of small masonry dams constructed on the rivers between Poona and the Water shed of the Western ghats by the Military Authorities. Flow irrigation from these dams can be made use of after the war.

Id/-

8-5-51.

Superintending Engineer,

Central Circle.

D.P.C.

Note on points raised in Government Memorandum P.W.D., No. 5257 /36/I dated 1-5-1943.

1. Increasing the storage capacity of the Major Irrigation Works in the Bombay Deccan.

This is certainly possible. Projects in various stages are under consideration even now, as on all major canals the demand has overtaken the supply since the establishment of sugar factories. The following describes in brief, particulars of these projects.

(i) A new dam at Vir for the Nira valley. The demand for water has overtaken the normal supply of about 24,198 M.cft. at Bhatgar. There is not enough water to meet the present demands for irrigation especially on the Nira Right Bank Canal. The 1922 project for constructing dam at Vir is being revised now in the light of up-to-date experience of duties, losses in transit etc. The proposed storage is 8,334 M.cft. and with this it should be possible to irrigate an additional area of about 5,000 acres sugarcane and about 12,000 acres rabi. The cost of the project is roughly Rs. 1,00,00,000 inclusive of percentage charges.

(ii) Proposal to construct a new dam at Khadakwasla with a larger storage capacity.

The existing dam stores 3,091 M.cft. of water which is used both for irrigation and for water supply to Poona. In recent years, even before the war the demands for the town water supply had increased to such an extent that a curtailment of the areas under irrigation was found necessary. The proposed new dam and the remodelling of the Mutha Right Bank Canal are expected to cost roughly Rs. 1,25,00,000 including percentage charges. The cost new storage will be 8,300 M.cft. against the existing storage of 3,091 M.cft. The proposal contemplates the extension of the perennial limit to the

tail of the Mutha Right Bank Canal and the following additional areas of irrigation .:-

4,300 acres monsoon seasonals.
13,000 " rabi seasonals.
4,200 " two-seasonals.
2,400 " sugarcane

The lands that will newly be submerged lie in the State of Bhor and the question of the State's consent for the amquisition of the land is still to be negotiated and is liable to prove troublesome.

(iii) Additional storage for the Godavary Valley.

The existing storage is at Darna and amounts to 7,760 M.cft. The damand has overtaken the supply on this system also. The schemes for providing additional storage have been considered as Fairly promising. The first is to raise the Darna Dam to provide an additional storage of 2,000 M.cft. at a cost of Rs. 26,00,000. This however, affects the G.I.P Rly. and it might be necessary move the alignment for some distance which would increase the cost.

The 2nd alternative is to construct a dam at Ganapur about 6 miles above Nasik. The scheme is estimated to cost about Rs. 62,00,000 inclusive of percentage charges and to provide 2,400 M.cft. for irrigation after being used for running a Hydro-electric power station at the dam.

(Iv) Additional storage for the Pravara Canals.

More water than can be supplied by the existing Bhandardara dam is needed. The waste weir at Bhandaradara has been raised by 5.7 ft. and this has resulted in increasing the storage at the lake from 10,089 M.cft. to 11,289 M.cft. It is possible to instal gates in the waste weir and to increase the storage from this to 12,092 M.cft.

In additional to this, additional storage might be provided by constructing a dam at Manglapur above Ozar weir. This needs detailed investigation. It appears that the site is capable of storing at least 3,000 M.cft.

In addition to the above mentioned projects for raising the storage capacity at the heads of the canals others for providing tail tanks and thus increasing irrigation water supply available in the tail areas also under consideration e.g. Tisango sonake tail tank for the Nira Right Bank Canal.

2. This will presumably be dealt with by the Superintending Engineer, Southern Circle.

3. If the lift is not high (say over 25') and if the area under irrigation, is rich and compact and if the irrigator export in his Profession, and cultivates only valuable crops like sugarcane and fruit trees, even in normal times it would not be uneconomical to lift water for such purposes. The party will need to be financially sound as there may be no profit for the first new few years. Such a proposition would hardly be a remunerative venture for the disbanded soldier for several reasons. A reference is invited to para 98 of the report of Irrigation Inquiry Committee 1938, in this connection.

4. Regarding wind mills, no data is available in this office. There appear to be some few places where wind mills could be used for irrigation. Perhaps this could be done to some extent in areas with high subsoil waterin the Deccan Canal tracts. It is understood that in 1938, this question was examined by the Agricultural Engineer to Government and his repo should be on the records of the Secretariat. In

brief, his findings appear to be that for a lift of about 50 ft. windmills could not compete with power pumps but would be cheaper than motes. The wind mills designed at present appear to work when the wind velocity is more than 6 miles an hour. Areas in the lower reaches of the Mira Left Bank and Right Bank Canal appear to be favourably placed in this respect and it would perhaps be worth investigating the wind velocities obtained in these tracts and others similarly placed on the Godavary and Pravara Canals.

5. It would be expremely uneconomical to take Ghat storage water to the usual famine areas say in the Bijapur District. It is roughly estimated that only 1/4 to 1/3 of the water available at the storage would be available for irrigation at the fileds and the cost of the canal would be excessive.

6. There is no doubt that tanks have the drawback referred to In the Government memorandum. Yet, they perhaps offer some protection in the not too bad years, in that they can supply the few much needed waterings when the rains hold off. There are very few such tanks in this Circle to give a more definite opinion. It is however, doubtful from the very size of these works whether they would be suitable for setting returned soliers.

No. 1975. of 1943. Poona, 8th May 1943.

Forwarded with compliments, to the Deputy Secretary

to the Government of Bombay, Public Works Department

with reference to Government Memorandum, P.W.D.

No 5257/36, dated 1-5-43.

Id/-

Superintending Engineer,

D.I.C.

DSB. 8-5.

~~NOTES.~~

Subject:- Points raised in Mr. Knight Advisor F's note regarding Irrigation works in the Post War Reconstruction period.

Reference:- Government endorsement (Public Works Department) No. 5257/36-I. dated the 1st May, 1943.

.....

Point (I). This Circle does not seem to be concerned as there are no large irrigation lakes. The Dhupdal lake is comparatively small. A Scheme for constructing a dam at Daddi across the Ghataprabha River (Some 25 miles upstream of the weir at Dhupdal) was dropped for the reasons stated at pages 33 and 34 of the "report on the Irrigation schemes in the Karnata."

Points (2).:- The five rivers in the Bijapur District namely :-

(i) Bhima
(ii) Don
(iii) Krishna
(iv) Ghataprabha
and
(v) Malaprabha.

cannot be dammed within the limits of the districts due to the resulting disproportionate submergence of fertile lands and villages upstream. The Don river is, moreover, salty and its waters have been found to be unfit to for irrigation purposes.

Pick up weir schmes across the Bhima and Krishna Rivers are not feasible owing to the flat gradients of these rivers, which would not make it possible to obtain command with irrigation channels of the flattest permissible gradients. However, the gradients of the Ghataprabha and Malaprabha of the rivers would

permit of pick-up-weir schemes. One such scheme
~~One such scheme~~ at Hirkal on the Ghataprabha
river and another at Shivyogmandir on the Mal-
aprabha river were dropped after investigation
as they would have been prohibitively costly. The cultivators,
moreover, do not seem to be prepared to pay the usual
water rates fixed for the major canals in the Deccan.
Further extensive propaganda would be necessary, as the
instincts of the cultivator is not towards irrigation in its
accepted sense.

At Gokak (Dhupdal) there is a weir and not a dam and
so submergence of land is not unduly large. Moreover, a consi-
derable portion of the water stored is reserved for the Mills.
During the Kharif season the weir function
as a diversion weir only since storage is not drawn
upon.

Point 3. This has not been investigated.
But from the fact that gravity schemes such as the
one at Shivyogmandir are not found to
yield a return of even 1 per cent., it is
very unlikely that pumping schemes would prove
feasible from the economic point of view.
Such schemes can perhaps better be left to
private enterprise in areas where money crops can be
grown and marketed at profit such as would justify the
heavy working expenses involved.

Point (4) An experimental windmill on the banks of the
Krishna River near Almatti has been installed. It has
been found that it can irrigate only some 12 acres of
Kharif crops. Generally speaking the wind velocity
is favourable only during the kharif season in Bijapur
District (for which season only the windmill was installed)

but not during the Rabi season. The potentialities of windmill irrigation are therefore restricted to the banks of rivers, and than too only some 12 acres of Kharif crop could be prrigated by one windmill. From the economic point of view, the water rate revenue from irrigation of this small area would not even pay the working expenses.

Point (5).:- This point has been investigated in the past and it was not found possible to bring water from ghat storages on to the famine areas in the Bijapur District. In this connection a reference is invited to pages 51 to 53 of the "Report on Irrigation Schemes in the Karnatak" Submitted to Government under this office No, M.I. 11, dated the 9th August 1938.

Point (6):- [illegible] famine areas generally f when most needed since replensishment depends upon the local rainfall and absorption and evaporation particularly under famine conditions are excessive. However, three fairly large and several small tanks are being constructed at present in the Bijapur District to provide for famine labour. No appreciable irrigation is expected from any of the small tanks, which it is hoped, will preve instrumental and in conserving run-off and improving underground water supplies in their vicinity.

General:- The question of irrigation schemes in the Southern Circle has been dealt with exhaustively in the report mentioned above. Subsequent to its submission the following developments have taken place :-

Ghataprabha Valley :

Gokak Left Bank Canal Extension:

Investigated and dropped as Government did not consider the scheme to be sound.

Pick-up-Weir At Herkal:

Investigated and dropped due to excessive cost and disproportionate submergence of fertile land.

Malaprabha Valley:

Aaga Scheme.:

Dur to difficulty of securing proper foundations for the sam the investigations have been suspended. Geological advice as regards suitable site is to be sought.

Pick-up-weir at Manoli:.

Dropped due to likely submergence of fertile lands.

Pick-up-weir at Shivyogmandir:

Investigated in detail and dropped due to very high cost and low return.

Storage Reservoir on the Dharma River:-

Investigated and shelved for the present.

Don Scheme:-

Dropped due to unsuitability of water for irrigation.

Attention is invited to two projects which it is considered are really " Worth while" they are :-

(a) Belgau. Water Supp1

the plans and estimate of which have now been completed under the guidance of the consulting public Health Engineer to Government,

and

These are urban water Schemes & must be carried out as soon as possible Id/-

(h) the combined water supply scheme for Dharwar and Hubli, known as the Jammihal Scheme, which it is understood, is now under preparation by the Consulting Public Health Engineer to Government.

In the case of both Belgaum and Dharwar. Development has been considerably retareded by the absence of a permanent water supply, Belgau, being almost entirely dependent on wells.

No. BJ. 22. Public Works Department,

Belgaum, 8th May 1943.

Submitted to the Secretary to Government in the Public Works Depa rtment, Bombay with reference to Government Endorsement referred.

Id/-

6-5-43.

Superintending Engineer,

Southern Circle,

Id/- 6-5-43.

Note on the possibilities of irrigation increase in Gujarat for Post War Reconstruction.

1. It is possible to have a large increase in the present Irrigation facilities as a measure for Post War Reconstruction in the Northern part of Gujarat comprising of the Ahmedabad and the Kaira Districts, the Pach Mahals and the Western portion of the Broach District by the constuction of new major irrigation works provided (i) funds are made* return on the capital outlay is not stressed too much. These schemes can only be taken up as "protective " and not "not productive" works. There is yet another serious difficulty about executing these schemes viz. the objection by the most suitable sites for the reserveirs are situated to submergence or acquisition of their lands. Gujarat is interspersed by the Durbars are generally averse to schemes benefitting British territories at their Cost. Some of them do not even permit preliminary surveys in their limits. Thus the Government of India s assistance will have to be sought if the works are approved for post war reconstruction. Some of these schemes which have been either contemplated or investigated in the past, are described briefly below to give an idea of the increase in irrigation that would be possible with their execution.

* available to meet their heavy cost and (ii) these financial

* surrounding Indian states in whose territories are situated the

*territories of various states over the whole country and

(1) Storage Reserveir for the Hathmati Canal System.

At present there is only a pick-up weir across the Hathmati River near Himatnagar in the Idar State for the Hathmati Canal Irrigating lands in the

Ahmedabad District. This does not give an assured supply but fails exactly when most needed and a scheme was suggested for a storage reservoir at Demai (about 6 miles above the present weir site) in the Idar State to ensure an assured supply. The Scheme was estimated to cost about Rs. 55 lacs for a storage of 5000 M.cft. including improvements to the existing canals, It was expected to irrigate 5000 acres of each of the two main crops viz. sugarcane and rice, In addition the scheme would give an assured supply of water to the Kalambandhi villages which are situated at the tail of the Khari Cut Irrigaters the question of Water supply has been an endless source of dispute. The percentage return on the capital outlay was forecast at 4.7% at pre-war rates. The scheme could not be fully investigated as the Maharaja of Idar declined to permit even the survey work for it.

(ii) The Mahi Canal Project in Kaira District.

The scheme as investigated in 1932 provides for:-

(a) A storage reservoir over the Panam river kel about 11 miles above Lunawada for a storage capacity of 7000 M.cft.

(b) A pic-up-weir at Wanakbori on the Mahi River.

(c) A right bank canal, 68 miles long, running through Thasra, Anand, Nadiad and Matar Talukas of the Kaira District and a part of Baroda State, territory.

The total cost of the scheme is estimated at Rs- 2 crores for irrigating an area of about 90,000 acres bringing in a Net return of about 3%. The scheme was shelved on account of the low return and the enormous capital involved. Government

have ordered in their Memorandum No. 8110/I, dated 19th April, 1934, that the Mahi Irrigation Project be kept in abeyance till financial conditions improve.

(iii) The Watrak Canal Project:

The scheme which would benefit Kapadvanj and Mehmedabad talukas of the Kaira District comprises of a dam across the river watrak near Bibipura forming a reservoir with a net strage of about 2,800 M.cft. and a canal system commanding an area of about 2,50,000 acres, of which 75,000 acres are asumed as irrigable. The cost of the Schemes is estimated at about Rs. 70 lacs which is expected to bring in a return of about 3%.

(iv) The Meshwa Canal Project.

The Mashwa Canal Scheme provides for putting up a pickup weir across the Meshwa river at Raska in the Kaira District with the main canal taking off just above the pick-up-weir and meeting the Khari river near Bidaj village, about 2 miles upstream of the first sluice of the "Khari Sluices Systems". The scheme is expected to cost about Rs. 12 lacs. The new area that would be brought under irrigation is estimated at about 8000 acres (excluding an area of about 1000 acres now under the Khari Sluices which is not at present assessed to Himayat under the Khari Sluices) giving a net return of about 2 % in addition to the above new area that will be brought under irrigation, the Meshwa canal scheme will be instrumental in helping further irrigation as under :-

(i) Giving a more assured supply to the present irrigation under the Khari Sluices

(ii) Increasing the irrigation under the Khari cut canal system by about 5000 acres in addition to assuring the present irrigation thereon.

Note:- The above two advantages will only materialise in the event of the Kalambandhi villagers agreeing to take up the water from the Meshwa canal and giving up their riparian rights on the Waters of the Khari river.

The project would benefit a portion of the Kaira District which is subject to scarcity conditions off and on. The rough revised project for the scheme has been submitted to Government on 6th April 1938 as desired by them.

(v) Sabarmati Canal Project:-

The project is at present being investigated by the Baroda State. It provides for, on completion of the two stages of its construction, a reservoir at Dharoi in Idar State with a left bank canal serving the Idar State and a right bank canal irrigating lands in the Baroda State and in sanand and Daskroi Talukas of the Ahmedabad District. As the British area happens to be at the tail of the tail of the Right Bank Canal system the supply of water can only be obtained from the State by fixing a definite quota for the Bombay Province, for which a share in the cost of the scheme may have to be borne.

(vi) Khari Reservoir at Bareda, Taluka Daskroi, District Ahmedabad.

The Schemes contemplates a reservoir on the Khari near Bareda in the Ahmedabad District. Two alternatives have been

roughly worked out and they are estimated to cost about Rs. 8 and 17 lacs respectively for a gross storage of 300 and 850 M.cft. The scheme has two-fold aspects viz. (i) to assure supply to the area irrigated under the Khari sluices in Kaira District and (ii) to minimise the damage caused by the floods in the Khari river.

II. In addition to the major schemes described above, it would also be possible to have additional irrigation facilities by the construction of what are termed "Minor Irrigation Works" such as (i) small tanks with a storages capacity of about 30-40 M.cft. and irrigating about 600 -800 acres, and (ii) drainage channels, which by effectively removing water-logging bring in additional area under cultivation and (ii) reclamation bunds that protect lands from inroads of sea water. Such schemes costing about 35 lacs for the Ahmedabad, Kaira, Broach and Panch Mahals Districts have been recently investigated by the then Executive Engineer, Minor Irrigation works, Gujarat, specially appointed by Government for the purpose of . Some of these schemes have been executed and the remaining works can be taken up as a part of the scheme for post-war Reconstruction.

It is no doubt true that these minor irrigation tanks fail during famine when they are most needed but it is equally true that these works are helpful in tiding over fairly bad years if the run off coefficient is assumed with care to provide for bad years. They would ensure a watering or two and keep up the crop w+

which would otherwise fail entirely.

III. Regarding irrigation by pumping it is true that it becomes very costly on account of the heavy cost of machinery and fuel but as pointed out by one (in 1938) Mr. G.S. Nagarkar, B.E., to Government the pumping schemes may be possible at cheaper rates (especially in respect of money crops like sugarcane in Deccan and Tobacco in Kaira District) than flow water from canals if electric power is available at cheap rates e.g. the Kolaba District where Tata power is available.

IV. As regards Irrigation by windmills, no such experiments have been carried out in this Circle, in the absence of which it is not possible to give any opinion on this system.

V. As regards the question of storing water in the Ghats, to irrigate famine stricken lands lower down, the only areas in this Circle with such geographical features (ghats) are the Thana and part of Kolaba Districts, which are hardly ever visited by famine.

It is also not possible to carry the water stored in these ghats to the usually famine stricken areas of Ahmedabad and Kaira Districts as well as Panch Mahals on account of the huge cost of construction and large transit losses

VI. In conclusion, it would not be out of place to point out again that all the major irrigation schemes described above are not quite renumerative from the financial point of view but very little regard need, in my opinion, be paid to this aspect as the other indirect advantages, such as (i) general increase in wealth and prosperity of the community due to increased irrigation, (ii)

(ii) the increase in sub-soil water level and the consequent improvement in the supply of drinking water water and (iii) the pattial mitigation of famine and scarcity would in the end far outweigh the narrow aspect of financial return in annas and pies.

No major irrigation work hitherto, has been taken up in this part of the Province, where the Soil is very fertile and with greater irrigational facilities, more and more of it can be brought under cultivation with richer crops. The Irrigation Enquiry Committee appointed by Government in 1938 has also recommended (vide please para 50 on page 23 of their report) the setting out of Rs. 20 lacs for constructiong irrigation works in this Circle in a period of five years and it will be a boon to the fertile lan it liberal allotments are made for new irrigation Schemes both major and minor.

11/5/43 Id/.

Superintending Enginser,

Northern Circle.

VRG. P'ra.

11-5-43.

Letter.

VERY URGENT. No. D.M.I. 9/5403 of 1943.

Public Works Department,

Camp via Bombay, 13th May 43.

To

The Secretary to Government,

Public Works Department,

Bombay.

Subject:- Post-War Reconstruction.

Refernce Government Memorandum, P.W.D.,

No. 5257/36. I , dated 1st May 1943.

A note on the possibility of irrigation increase in this Circle (Gujarat is the only part where irrigation is most required) and other points raised by Adviser (F) is submitted herewith as desired. How far these schemes can provide for settlement ~~of~~ of soldiers after war is a matter for the Revenue authorities to consider but some groups of land commanded by most of the large schemes and some minor irrigation works can surely be chosen for the settlement.

11/5 Id/-

Superintending Engineer,

Northern Circle.

D.A. 1 Note.

DE/F'ra.

11-5-43.

5257/36/10573

I.B.

Submitted.

2. The S.Es of Circles have submitted their reamrks on the points raised in A(F)'s note dated 30-4-1943.

Point (1) of A(F)'s note re: increase in the storage capacity of large irrigation works:-

The S.E., D.I.C. points out that in the Deccan it is possible to increase the storage capacity of major irrigation works and that the followir projects are under consideration even now in view of that fact that on all major canals the demand has overtaken the supply since the establishment of Sugar Factories :-

(1) A new dam at Vir for the Nira Valley

(2) A new dam at Khadakwasla.

(3) Additional storage for the Godavary Valley.

(4) Additional storage for the Pravara Canals.

It may, however, be noted that these schemes cannot be undertaken during the war due to the fact that the excavations in rock foundations necessary for such dams necessitate the use of a considerable amount of machinery of different types which it is quite impossible to obtain during the war.

As regards such projects in Gujarat firstly they are very costly and there is another serious difficulty viz. the objection by the surrounding Indian States in whose territories are situated the most suitable sites for reservoirs, to submergence

or acquisition of theur lands. Some of the states do not even permit preliminery surveys in their limits.

Point (2) of A(F)'s note re: putting bunds lower down the rivers which pass through the Bijapur and other Districts. The S.E. S.C., points out that the five rivers in the Bijapur District viz. (1) Bhima, (ii) Don (iii) Krishna (iv) Ghataprabha and (5) Malaprabha cannot be dammed within the limits of the Dt. due to the resulting disproportionate submergence of fertile lands and villages upstream. The Don river is moreover salty and its waters have been found to be unfit for irrigation purposes. The pick-up-weir schemes across the Bhima and Krishna rivers are not feasible owing to the flat gradients of these rivers, which would not make it possible to obtain command with irrigation channels to the flattest permissible gradients. However the gradients of the Ghataprabha and Malaprabha rivers would permit of pick up weir schemes. One such scheme at Kerkal on the Ghataprabha river and another at Shivyogmandir on the Malaprabha river were dropped after investigation as they would have been prohibitively costly. At Gokak there is a weir and not a dam and so the submergence of land is not unduely large. Moreover a considerable portion of the water stored is reserved for the mills. During the Kharif season the weir functions as a diversion weir only since the storage is not drawn upon.

Point (3) of A(F)'s note re: pumping of water from the Deccan rivers. The S.E., D.I.C. points out that lift irrigation possible only under special circumstances such as :-

(i) the lift is not high (say over 25')

(ii) the area under irrigation is rich and compact.

(iii) the irrigation is expert in his professional and cultivates only valuable crops like Sugar cane and fruit trees.

(iw) Party must be financially sound as there would be no profit for the furst few years.

Such a proposition would hardly be a remunerative venture for the disbanded soldier for several reasons.

Point (4) of A(F)'s note re: irrigation by Wind mill. The S.E., S.C. points out that an experimental wind mill on the banks of the Krishna river near almatti ~~that-it-can~~ has been installed. It has been found that it can irrigate only some 12 acreas the of Kharif crops. Generally speaking the wind velocity is favourable only during th Kharif season in Bijapur District but not during rabi season. The potentialities of wind ~~mil~~ mill irrigation are therefore restricted to the banks of rivers and them too only some 12 acres of Kharif crops could be irrigated by one wind mill. From the ~~re~~ economic point of view, the water rate revenue from irrigation of this small area would not even pay the working expense.

Point(5) of A(F)'s note re: Irrigation of the famine areas from the water stored in the Ghats. The S.E., S.C. states that this point has been investigated in the past and it was not found possible to bring water from ghat storages on to the famine areas in the Bijapur District.

The S.E. D.I.C. points out that it would be extremely uneconomical to take ghat storage water to the usual famine areas of the Bijapur District. It is roughly estimated that only ¼ to 1/3 of the water available at the storage would be available for irrigation at the fields and the cost of canals would be excessive.

Points (6) of A(F)'s note re: tanks in famine areas.: The S.E., S.C. points out that tanks in famine areas generally fail when most needed since replenishment depends upon the local rainfall and absorption and evaporation particularly under famine conditions are excessive. However three fairly large and several small tanks are being constructed at present in the Bijapur District to provide for famine labour. No appreciable irrigation is expected from any of the small tanks, which it is hoped, will prove instrumental in conserving run-off and improving underground water supplies in their vicinity.

Sd/- 17-5-43. Thro A.E.

Id/- 24-5-43. B.K.M. 17-5-43.

4A A(R) ..... My views are as follows.

A(F) (1)

d/- 29-5-43.

1) Large Capital works or extensions of such.

The notes of the Superintending Engineers show sharp conflicts of opinion, due probably to their individual views on the policy of low returns as against protective insurance against scarcity.

I should say that :

Deccan: We should again examine the feasibility of the four major schemes referred to in Mr. Hammett's note and, if examination proves them at all possible, decide on one of them.

Southern Division: I think we should perservere with one or more of the Merkal, Asoga, Sivyogmandir and Dharma Schemes. I am not clear whether one of these is the scheme for irrigation on the Malaprabha river on the Dharwar border between Nargundpetha and Ramdurg state. If so, there is a strong local demand for ot.

Northern Division: This has received less than its fair share of attention. Clearly all works which entail negotiation with Indian States ought to be alregated to the Distant futurem but the Watrak and Meshwa Schemes seem to be compratively promising.

I am not clear how far examination of all Mr. Lewsley's minor irrigation schemes, referred to in Mr. Roch's note, has been exhausted.

Major schemes are of course valuable as post-War relief works.

(ii) Pumping and Windmills Schemes.

These are patently uneconomical at present. I would leave such schemes entirely to be put up by individual soldier settlers after they return, when they can be considered on their merits. I see no object in investigating them now.

The possibility of connecting them with increased electricity supply, if and when the grid system is introduced, might be borne in mind.

(iii) The general consensus of opinion that further irrigation from storage in the Ghats is futile is obviously correct.

Mr. Garrod refers to the successful masonry dams constructed by the Military. If this is so,, I do not see why suitable sites for such should have been exhausted and more may be possible with due attention to preservation of easements.

(iv) Tanks in Scarcity area

Fifty years experience has shown the futility of these. No responsibility is paid on the villagers to keep them in order. At the next famine tanks dug at the previous one are shown to have reverted to their former condition. Many too are not completed. They are in fact a sop to the villagers who want easier work than road repairs or work near their villages. We have returned to them on the present occasion as a concession to public opinion and I admit I have supported them. The only ones justifiable are those which can be completed and then taken over by P.W.D.
as irrigation works.

2. I think A(F) will be sufficiently armed to tell col. Franks the very limited potentialities of irrigation. He might say that large bunding schemes are indirect irrigation and afford the best premise of better cultivation and increased returns to returned soldiers.

Id/- 2-6-43.

Id/- 20-4-56.

A(F).